Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Intermediatea PreAlgebra	Unit 6 Title:	Algebraic Proportional Reasoning	Grade Level(s):	7
Assessed Trimester:	Trimester 2	Pacing:	9-12 Days	Date Created:	5/31/2014	Last Revision Date:	6/18/2014

Course Understandings: *Students will understand that:*

A. There are multiple strategies and representations that can be used to solve real world problems involving rational numbers.
B. In the real world there are multiple representations of linear functions.
C. Proportional reasoning and percents can be used to solve real world problems.
G. There are appropriate uses for various technologies and that limitations may exist with them.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

Minnesota State/Local/Technology Standard(s) addressed (2007):

- **Standard (7.2.1.#):** Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships.
  Benchmark:
  7.2.1.1 Understand that a relationship between two variables, *x* and *y,* is proportional if it can be expressed in the form y/x = *k or y = kx.* Distinguish proportional relationships from other relationships, including inversely proportional relationships *(xy = k or y =* k/x*).*
  7.2.1.2 Understand that the graph of a proportional relationship is a line through the origin whose slope is the unit rate (constant of proportionality). Know how to use graphing technology to examine what happens to a line when the unit rate is changed.

- **Standard (7.2.2.#):** Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols and graphs; solve problems involving proportional relationships and explain results in the original context.
  Benchmark:
  7.2.2.1 Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
  7.2.2.2 Solve multi-step problems involving proportional relationships in numerous contexts.
  7.2.2.3 Use knowledge of proportions to assess the reasonableness of solutions.

- **Standard (7.2.4.#):** Represent real-world and mathematical situations using equations with variables. Solve equations symbolically, using the properties of equality. Also solve equations graphically and numerically. Interpret solutions in the original context.
  Benchmark:
  7.2.4.2 Solve equations resulting from proportional relationships in various contexts.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- You can use tables, equations, and graphs to represent and solve real world proportional problems.

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● Proportional relationships can be represented using tables, equations, or graphs. ● Unit rate (constant of proportionality or slope) can be found using tables, graphs and equation. ● The relationship between two variables is proportional if in the form y=kx. ● The graph of a proportion goes through the origin. ● What happens to the graph of a proportional relationship when the unit rate is changed.	**Students will keep considering:** ● How can you use tables, equations, or graphs to represent a proportional relationship? ● What is the connection between rate and slope? ● How is thinking algebraically different from thinking arithmetically? ● How can you recognize a proportional relationship?

Acquisition

Knowledge - Students will:	Reasoning - Students will:
● Use ratios and proportions to solve problems. ● Understand proportion and unit rate. ● See slope as a unit rate, rate of change, constant of proportionality. ● Define coordinate (ordered pairs) ● Identify the origin on a coordinate plane. ● Use tables, graphs, and equations to solve problems involving proportional relationships.	● Organize real world data into proportions and ratios. ● Determine when real-world data can be represented by a proportion. ● Translate from one representation of a proportional relationship to another. ● Determine what happens to the graph when the unit rate is changed. ● Distinguish between (*x*, *y*) coordinates and how this relates to the *x* and *y* axis. **Skills - Students will:** ● Use proportional reasoning to solve problems. ● Represent proportional relationships with tables, verbal descriptions, symbols, graphs, and equations: translate from one representation to another. ● Determine the unit rate. ● Plot pairs of positive and negative rational numbers on the four quadrant coordinate grid.

Common Misunderstandings	Essential new vocabulary
● Thinking that all relationships that increase or decrease by a constant value are proportional. ● Determining the wrong unit rate by dividing in the wrong order. ● Confusing the x and y axis when plotting points on a coordinate grid. ● Students use the ratio x/y for slope ratio. ● Students mistakenly think slope is only found on graphs, but slope is a way of describing a constant rate of change that can be graphical, tabular, or symbolic. ● If students are unclear about what they are dividing or what they are trying to find out, they often can get a constant that is not appropriate; they could be satisfied just getting an answer and moving on, not testing the reasonableness of their answer.	● Coordinate ● Origin ● Slope (unit rate, rate of change, constant of proportionality)